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ABSTRACT

A study investigated the effectiveness of semantic mapping as a technique to improve recall of word meaning versus the traditional method of teaching vocabulary. Eight intermediate-level students from grades 4, 5, and 6, five of whom were identified as learning disabled students, were subjects. They were tested using vocabulary subtests of the Gates-McGinitie reading tests to determine the words that were unknown. The students were then presented words using the traditional technique and other words using semantic mapping. A month later a posttest of all words was administered. The two methods of instruction were compared using the Wilcoxen Two Sample Test. Results showed that the total number of word meanings remembered in the free recall setting and in context was greater for those taught by the semantic mapping technique than for those taught by the traditional method. (EL)

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SEMANTIC MAPPING AS A VOCABULARY TEACHING TECHNIQUE TO IMPROVE RECALL OF WORD MEANING

BY

Darlene Vogt

A paper submitted in partial fulfillment of
the requirements for the Master of Education
Degree in Reading
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TO IMPROVE RECALL OF WORD MEANING

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Chapter 1

Introduction

Traditionally vocabulary development has been taught as memorization, but, in fact, vocabulary development is much more complex and involves cognitive restructuring. Recognizing words, understanding concepts, and reading are all part of vocabulary development which occurs through cognitive restructuring in search of answers. Learning requires thought, and thought can be stimulated, guided, challenged, and restructured through the type of instruction a teacher provides (McIntyre, 1977). Instruction must foster interaction which goes beyond simple memorization or passive acceptance.

" A word is a verbal label that represents a concept or idea." (Harris and Sipay, 1975, p. 438). Concepts represented by words gradually become more refined and accurate. Concepts are the cognitive structures that must be developed in the course of intellectual functioning. This process necessitates connecting units of meaning with certain conceptual patterns that exist in one's memory. It is only through functioning, or active thought processes, that concepts are formed.

Vocabulary development should be viewed as conceptual development. Vocabulary development is not just adding new

words to one's experiences, but putting concepts into better or additional arrangements. Concept formation consists of the perception of relationships. It involves inferences, attributes, and categories, as well as, experiential background. Meaningful vocabulary building is concept building. (Dale and O'Rourke, 1971)

The development of one's meaning vocabulary, is, therefore, a contributing factor to the organization of one's reality into concepts. Johnson and Pearson (1978) state that:

> concepts are derived from repeatable, segmentable reality which is the composite of one's internal and external experience. Thus, the relation between vocabulary expansion and experiential growth is parallel and inseparable. (p. 35)

Yet, when teachers do provide instruction specifically intended to increase vocabulary knowledge, it is frequently ineffective because it is unsystematic or the particular technique used is traditional or not based on valid research knowledge (Humes, 1976).

Traditional vocabulary instruction generally involves a list of words that students must look up in dictionaries. The students write definitions from the dictionary, and then write

sentences incorporating the words (Draper and Moller, 1971), or in the case of the basal workbook, the students place words in the appropriate preconstructed sentences.

Another method to develop vocabulary is semantic mapping, also termed semantic webbing. It is a process for constructing visual displays of categories and their relationships. Semantic mapping is an instructional strategy to develop vocabulary based on the idea "building bridges between the new and the known" (Johnson, 1982, p. 8). It is a way for students to organize and integrate concepts for meaning (Freedman and Reynolds, 1980).

Semantic mapping is a versatile technique. Maps can be formed from individual or group contributions and through teacher - directed or independent activities. Experimentation with applications of semantic mapping in all curricular areas is being conducted, in addition to challenges to discover new ideas for using this technique (Cleland, 1981).

The Problem

A planned, systematic vocabulary program provides a student with opportunity to build new concepts upon old ones. Students must be encouraged to see relationships and make associations. It also helps students to develop a "flexible

mental file for storing and retrieving words. New words aren't of much value if they are filed and lost." (Dale and O'Rourke, 1971, p. 3).

The purpose of this study is to investigate the effectiveness of semantic mapping as a technique to improve recall of word meaning versus the traditional method of teaching vocabulary.

With the knowledge that vocabulary instruction should be direct, systematic, and draw relationships between the meanings and learner's background, it is hypothesized that there will be greater recall of word meaning by using semantic mapping as a vocabulary teaching technique, than by using the traditional vocabulary teaching technique.

Definition of Terms

The traditional method is defined as looking up words in the dictionary, writing the definitions, using the words in a sentence, and placing them in preconstructed sentences.

Semantic mapping is defined as writing the word on the chalkboard, giving the meaning of the word and asking students to think of words related in some way to the word written, creating the semantic map on the chalkboard as students are associating and relating the word to their own background

experiences, and, finally discussing the relationships.

Recall is defined as knowing (remembering-retrieving from memory) the meaning of the word when it presents itself visually and/or auditorily in isolation and/or in context at a later interval of time.

Review of Literature

If we view vocabulary development as concept formation, not only do we need to concern ourselves with whether or not vocabulary should be taught, but we must concern ourselves with the decision over which kind of instruction is most effective (Carmine, Freschi, and Kameenui, 1982; Duffelmeyer and Duffelmeyer, 1979; Kepper, 1977). Recent studies (Juel and Rosen, 1981; Kepper, 1977) conclude that more than wide reading is necessary for good vocabulary development. Kepper (1977) points out that it was demonstrated that it is possible for adolescents to read the same word many times in context without learning its' meaning. Juel and Rosen (1981) indicated that children are not successful in learning word meaning through reading a story, however, they did find that vocabulary instruction has a positive effect on comprehension. The schools, therefore, will continue to teach vocabulary development.

But, there is debate over teaching vocabulary as isolated words in lists versus vocabulary related to the child's interest and experience. Dolch (1955) views this as either memorizing definitions or forming meaning in relation to experience. This would characterize the traditional and the concept formation approaches to teaching vocabulary.

Traditional Theory

Gipe (1979) summarized a traditional view of learning word meaning as an association task, whereby an unknown word's meaning can become known by being presented in connection with a word of similar meaning. This is based on a cognitive theory for an associative memory structure that items presented together are likely to be recalled together.

Humes (1977) emphasizes various levels of encoding and decoding skills that are necessary functions of word meaning according to Cronback (1942):

1. generalization - the person can define the word
2. application - the person can recognize an appropriate illustration of the word
3. breadth of meaning - the person can recall different meanings for a word and knows when its use is appropriate in a paritcular context

4. precision - the person can apply the term correctly in all possible situations, even unfamiliar ones.
5. availability - the person can use the term in thinking and in discourse

These levels were established in the early 1940's, yet, in many instances, they are the focus of current vocabulary instruction in schools.

Ekwall and Shanker (1983) specify the following activities for vocabulary development:

1. Make charts showing new words learned. Immediately below each word show how the new word was used in context the first time it was encountered. Review each chart regularly and have students use words on the chart in a sentence. Continue to review until new words have been thoroughly learned.
2. When studying any new word, emphasize the meaning as well as the ability to recognize it. One of the best ways to determine whether students know words is to have them use them in sentences different from the

ones in which they were originally encountered.

3. Set aside specific time for word study. Words should also be studied whenever they appear, but setting aside a specific time for study will help make students more aware of new words when they appear.
4. Encourage students to try to think of synonyms and antonyms for new words as they are encountered. Work with crossword puzzles will help increase students' knowledge of synonyms.
5. Make certain that students know how to use the glossaries in each of their textbooks. Provide practice exercises using the glossary, and discuss word meanings as they are found. (Ekwall and Shanker, 1983, p. 231)

Harris and Sipay (1975) discuss a method of teaching new words as follows: Before reading a selection, the teacher picks out words that may need explanation. The words are written on the board, and the teacher explains the meaning of each word, and uses it in one or more sentences. The children are asked

to suggest other sentences in which the word can be used. Then the selection is read.

> One difficulty with this procedure is the danger of relying on superficial verbalizations. Meanings that are clear to the teacher may be quite hazy to the child. (Harris and Sipay, 1975, p. 446)

Other suggestions for vocabulary development include, word lists, word parts, dictionary use, vocabulary notebooks, word origins, synoyms, homonyms, antonyms, workbooks, and context (Ekwall and Shanker, 1983; Harris and Sipay, 1975; Heilman, 1972).

Gipe's study (1979), designed to investigate four techniques for teaching word meaning, included an association method, which paired unknown words with a familiar synonym or two or three word definition; a dictionary method, where subject looked up the word in the dictionary, wrote definitions, and wrote sentences containing each new word, and a context method, which consisted of three sentence passages where subjects looked up the word in an appropriate context, one of which was a definition. The results of the study showed support for the use of the association and context methods, however, Margolin (1982) points out that these results did not replicate.

The results of the study showed no support for the dictionary method.

The dictionary as a tool, must be approached with a sense of perspective. Kepper (1977) says that the dictionary is not the lone authority for gaining word meanings. Even though it is a valuable reference book, its limitations should be recognized, and students should be led to see that context itself is at times the best clue to meaning.

Gipe (1977) adds that for initial learning of word meanings, the use of the dictionary is not helpful because the definitions and sentences are such that unless the user has prior knowledge of the words meaning, there is nothing available in the definition to "trigger" the interactive process.

Concept Formation Theory

Two views of teaching word meanings as summarized by Gipe (1979), can be combined to explain concept formation with regard to semantic mapping. Learning word meanings can be viewed as an organized categorical or labeling task. The new word's meaning can become known by including it in a category with other known words which represent the concept of the new word's meaning. The new information is added to the old information by associating categories and properties common

to all those in the categories. The new information is "fit" into the old information wherever possible. Familiar context guides the learner to "old information" present in his/her conceptual base. Then the word is assimilated on the basis of the individual's background experience. This is representative of a cognitive theory for an interactive long term memory structure. New information and the whole semantic memory system can change or reorganize.

Gipe (1979) adds that instruction should make use of what the child already knows to teach new word meanings. If a child is introduced to a new word with no indication of how and when the word should be used,

> there is nothing available to him that will "trigger" the interactive process of the cognitive structure for assimilation of new information. (p. 642)

Knowledge of concepts associated with stimulus words is schematically rather than randomly organized (Pearson and Johnson,1978). Schema theory stresses an interaction between an individuals' background and experience and the information presented in a particular situation as a basis for derived meaning. These are "active processes" with "recognition devices" to determine the "fit" of the informa-

ion being processed (Rumelhart, 1977).

In a study designed to investigate the effects of two types of organization on free recall learning, the results were that the subjects recalled more when the material was organized in a schematic organization (i.e. going skiing, going to a party) than when the material was organized in either a taxonomic or random organization (i.e. food, places). Differences in taxonomic and schematic organization effect encoding and retrieval. The results of this study indicated that expectations provided by the schematic organization are applied during the retrieval stage as opposed to the encoding stage. Mandler and Rabinowitz (1981) also point out that in the past, theories of semantic memory have emphasized taxonomic organization. However, recent theories of conceptual structure which emphasize schemata (i.e. knowledge of events, objects, etc.) as the basis of the memory system, propose that the semantic memory system be thought of as several types of organization, rather than just taxonomic (categorical) organization. Further, both taxonomic and schematic organizations are hierarchical, but schematic organization have the added demensions of temporal (i.e. time) and casual (i.e. random) connections. A differential factor in taxonomic and

schematic organizations can be vertical versus both vertical and horizontal connections.

Gipe (1979), also investigated a category method as a technique for teaching word meanings. The category method required subjects to add to lists of words in categories. The lists had a "target" word and three familiar words. Subjects were to add words from their own background, and then recategorize a random listing of all previously used words. Results showed less support for this method than for the association and context methods discussed in the traditional theory section. Gipe relates this to the distinction between recall and recognition, saying organization of a categorical nature facilitated recall but not recognition. Recall was synonymous with retrieval and recognition meant storage of word's meaning had occured. However, Gipes' category method did not include explication of member similarities and differences as is part of semantic feature analysis (Margolin, 1982).

Clewell and Haidemonos (1982) suggest the use of webbing (mapping) because it provides for important features of schema theory which emphasizes the importance of the learner's background knowledge. It provides a way for the learners to

assimilate information and encode it in their memories. Schemata are not only useful for encoding information, but also for retrieving or remembering information. Ideas must be organized and have a meaningful framework for the learner to recall information.

Margolin (1982) did a study to determine if a semantic mapping vocabulary approach would be more effective in influencing vocabulary and comprehension than context clue provision. The results of this study were that semantic mapping has a greater positive impact on both specific and generalized vocabulary acquisition than does the context clue approach and students acquire greater vocabulary knowledge through a semantic mapping approach than a typical context approach.

Summary of Literature

Even though research comparing the effectiveness of traditional methods of teaching vocabulary is inconclusive (Harris and Sipay, 1975), these methods are still being used and advocated currently (Ekwall and Shanker, 1983). Yet recent evidence suggests the use of techniques, such as semantic mapping, which emphasize schematization to

facilitate recall for vocabulary and concept development.

The intent of this study is to examine the effectiveness of semantic mapping as a technique to facilitate recall for vocabulary development.

CHAPTER II

METHOD

Subjects

An existing population of eight intermediate level (grades four, five, six) subjects from the entire elementary school district of 143 students was used in this study. Five of the subjects were identified learning disabled students, while three of the subjects are not. All of the subjects received remedial instruction in the area of reading. Two of the subjects are in the fourth grade, four are in the fifth grade, and two are in sixth grade, while two of the subjects are girls and six are boys.

Instruments

The words used in this study were taken from the Gates-MacGinitie Reading Tests, levels D, E, and F, form 2, which correspond to grade levels six, seven, and eight, respectively coefficient of .90 by the Kuder-Richardson formula.

Procedure

The vocabulary subtests of the Gates-MacGinitie Reading Tests were administered to all of the sixth, seventh,

and eighth grade students from the elementary population. An item analysis was done to ensure that the words used for each presentation technique were of equal value in difficulty.

The subjects in this study were pretested, using the vocabulary subtests of the Gates-MacGinitie Reading Tests, to determine words that were unknown to all of the subjects. This was accomplished by writing a word on the chalkboard, saying the name of the word, and asking its meaning orally. The subjects responded orally. If no subject knew a meaning of the word, it was put on a list for further use in this study. The subjects were told what the word was, since the pretest was to determine knowledge of word meanings, not word recognition. In addition, because this study is concerned with recall, the use of all unknown words was a means of simplifying recall measurement.

Once the unknown words were listed, the item analysis that had been done was used to separate the words into groups of equal difficulty value.

The following procedure was then implemented. Presentation of the words occurred in the resource room, with the resource teacher, during the subjects' regularly

scheduled time in the resource room. This provided for a completely natural learning environment, and the presentations were provided by the same teacher, to all of the subjects at the same time, to control for differences in presentation or use of technique.

Six words were selected from the complied lists. The subjects were presented with three of the words using the traditional technique. The traditional technique involved looking up words in the dictionary, writing the definitions, using the words in a sentence. Directly following this, the subjects were presented the other three words, using semantic mapping as the instructional technique (see procedure for semantic mapping under definition of terms).

The third day after presentation, the subjects were tested to determine which, and how many, word meanings were recalled. Testing was accomplished by taking each subject individually, and asking them orally the meanings of the six words. Following that, the subjects were given a list of the words, along with incomplete preconstructed sentences, which the subjects had to complete by putting the words into the context of the appropriate sentences. (Testing was completed for each method of presentation during the same

time period, on the same day).

The following day, the procedure began again, with six new words. This time, the semantic mapping technique was used first, followed by the use of the traditional technique. The procedure was repeated for five more presentations. Each time, the traditional technique and the semantic mapping technique were alternated as the first method of presentation.

One month after the last group of six words was tested, a posttest of all the words presented in the study was administered. The posttest was administered using the same method that was used to test the individual groups of words presented.

Limitations of this study include the number of subjects used, the fact that it was an existing population, the subjects received both treatments, and the subjects did see the words used in the research when determination of the extent of their vocabulary was made.

Analysis

The two methods of instruction were compared using the Wilcoxon Two Sample Test. This statistical test results in a summing the ranks of the scores and comparing the smaller sum (called T) to a table of probabilities to determine statistical significance.

CHAPTER III

RESULTS

The purpose of this study is to investigate the comparative effectiveness of semantic mapping and the traditional method of teaching vocabulary as techniques to improve recall of word meaning.

Table I. indicates the number of word meanings remembered in the free recall setting, for the session tests, by individual subject (Sfrp). The numbers of words recalled are ranked and summed, with the result Tsip=38.5 and $P<.001$.

Table II. indicates the number of words recalled in context, for the session tests, by individual subject (Scp). These numbers are also ranked and summed, with the result Tscp=59 and P=.191.

Table III. indicates the number of word meanings remembered in the free recall setting, on the posttest, by individual subject (Sfrpp). The numbers of words recalled are ranked and summed, with the result Tsipp=37 and P=.000.

Table IV. indicates the numbers of words recalled in context, on the posttest, by each subject (Scpp). These numbers, once again, are ranked and summed, with the

result Tscpp=50.5 and P<.041.

Dicussion

The total number of word meanings remembered in the free recall setting and in context is greater using the semantic mapping technique than by using the traditional technique. Also, ranks of semantic mapping are significantly different from ranks of the traditional technique. Therefore, the hypothesis that there would be greater recall of word meanings by using semantic mapping as a vocabulary teaching technique, than by using the traditional vocabulary teaching technique, was supported.

The number of word meanings recalled was greater using semantic mapping than the traditional technique, both in free recall and in context, on the session tests and posttest. The statistical test indicated that there were significant differences in numbers of words recalled in free recall, for the session tests and the posttest.

In context, statistical differences were found only for the posttest, but not for the session tests. Thus, the greatest degree of significance was indicated in recalling word meanings in the free recall situation. This is

particularly interesting, because it generally is more difficult to recall meaning in isolation. The fewer words recalled in context could be due to syntactic interference, conceptual load, language use, motivation, testing strategy, and possibly other reasons, which should be investigated. Still, the semantic mapping technique would seem to be a desirable strategy to help students recall word meaning.

The learning disabled subjects were chosen for this study because they generally have more difficulty understanding word meanings, recalling word meanings, seeing relationships, and organizing and integrating concepts for meaning, than the average student. They may also have more difficulty with the syntactics of language. Due to the fact that these learning difficulties do exist, it is important to find useful, effective techniques to aid recall as a means of developing vocabulary to improve reading comprehension, and therefore, improve achievement. Semantic mapping has a positive affect on recall.

Further study of the use of techniques to teach vocabulary, as related to recall, should be conducted. The use of other populations, other methods of testing recall, and larger quantities of words and subjects would be essential to collect the data necessary to provide more conclusive results.

The importance of this study, and further study, of techniques to aid in recall and retention of word meanings, is reflected in the knowledge that vocabulary development affects reading comprehension, and reading comprehension affects achievement.

Table I

Meaning Recall Session Tests

Traditional		Semantic Mapping	
Number of words recalled	Ranks	Number of words recalled	Ranks
3	12	8	7
0	15.5	9	4.5
8	7	11	1.5
2	13.5	9	4.5
4	11	11	1.5
2	13.5	10	3
0	15.5	7	9.5
7	9.5	8	7
	97.5		38.5

Tsfrp=38.5

P<.001

Note: Number of words recalled based on possible total of 21 words.

Table II

Context Session Tests

Traditional		Semantic Mapping	
Number of Words recalled	Ranks	Number of Words recalled	Ranks
4	15.5	11	8
12	5.5	11	8
12	5.5	14	2.5
11	8	16	1
10	10.5	14	2.5
8	12.5	10	10.5
4	15.5	8	12.5
13	4	5	14
	77		59

Tscp=59

P=.191

Note: Number of words recalled based on possible total number of 21 words.

Table III

Meaning Recall Posttest

Traditional		Semantic Mapping	
Number of Words recalled	Ranks	Number of Words recalled	Ranks
2	13	7	6.5
0	16	7	6.5
6	8	8	4.5
2	13	9	2.5
4	10.5	8	4.5
2	13	9	2.5
1	15	5	9
4	10.5	..	1
	99		37

Tfrpp=37

P=.000

Note: Number of words recalled based on possible total of 21 words.

Table IV

Context Posttest

Traditional		Semantic Mapping	
Number of Words recalled	Ranks	Number of Words recalled	Ranks
11	8	13	4.5
8	14	10	9.5
10	9.5	16	2
12	6.5	19	1
9	12	12	6.5
6	15	9	12
4	16	9	12
13	4.5	15	3
	85.5		50.5

Tscpp=50.5

P<.041

Note: Number of words recalled based on possible total of 21 words.

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APPENDIX A

List of Words Presented using Traditional Technique

sulk
calmity
mastery
lease
satisfactory
logic
tolerate
tariff
dramatic
nonpartisan
treachery
jovial
zealous
pandemonium
solace
usurp
deride
realm
submissive
composure
chafe
anguish

APPENDIX B

List of Words Presented using Semantic Mapping Technique

strum
significant
foolhardy
ordeal
decrepit
ineffectual
submissive
fervor
prevail
emphasize
compensation
sane
exceed
fantasy
glimmer
porous
colossal
impact
rancid
sequal
grope

APPENDIX C

List of Sentences used in Testing in Context

This play was written as a _____to the other play.

The woman kept her _____during the argument.

The terrible accident caused _____for the families of those involved.

The meat was _____so we couldn't eat it.

The man _____for the secret passage out of the cave.

The starch in the shirt caused him to _____his neck.

He waited for his friend to come with _____.

Those who are the strongest will_____.

They had a plan to _____the city.

Being a _____person, she promptly did as she was told.

The grizzle bear ruled his _____fiercely.

The children like to _____each other.

Jack will _____if he can't go to the party.

When I help a friend, I don't want _____.

The unexpected flood caused _____in the town.

I think my aunt is a _____person.

My brother learned to ride his bike and now he has _____ over it.

I will _____when the meeting is to begin.

Sometimes it is hard to _____people who talk too much.

The play I saw was very _____.

Some buildings in large cities seem _____ in size.

The rock was light because it was so_____.

People must pay a _____when they bring goods into our country.

When my best friend moved to a new town, it has an _____ on my life.

If you want to use reasoning in an arguement you should use _____.

He did a _____job building the fence.

The light on the water caused it to_____.

To dream of what you would like to be could be called a _____.

People are always trying to _____their limits.

In order to rent the apartment you must sign a _____.

He was _____because someone gave him a present.

When someone has no political preference they are _____.

If you want to make sound on a string, you can _____it.

To do something against someone is an act of _____.

It is _____to stand on your head in the rain.

Something that has meaning and importance is _____.

The hotel was _____because it was very old.

The children were _____about summer vacation.

Riots cause _____.

The treatment used to cure the disease was _____ so it is no longer in use.

The most difficult time I've ever experienced was such an

_____that I hope it never happens again.

Sometimes one can find _____in being alone.